

# TROUT CREEK OPERATION & MAINTENANCE

9404200

## SHORT DESCRIPTION:

Provide for maintenance of existing habitat improvements to ensure habitat recovery to increase natural production of wild Deschutes River summer steelhead.

## SPONSOR/CONTRACTOR: ODFW

Oregon Department of Fish and Wildlife

Ray Hartlerode, Project Leader

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## SUB-CONTRACTORS:

none

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## GOALS

### GENERAL:

Supports a healthy Columbia basin, Maintains biological diversity, Maintains genetic integrity, Increases run sizes or populations, Provides needed habitat protection, Program coordination or planning

### ANADROMOUS FISH:

O&M

### NPPC PROGRAM MEASURE:

7.6B.5

### RELATION TO MEASURE:

The project relates to the above program by restoring summer steelhead habitat in the Trout Creek Basin. The proposed actions are to be undertaken for the purposes of mitigating the losses of fish and wildlife associated with the construction and operation of Federal hydro-power facilities in the Columbia River Basin and to protect and restore, to the extent practicable, the aquatic and terrestrial resources in the Deschutes Subbasin.

### TARGET STOCK

Deschutes River Steelhead

### LIFE STAGE

Adults, juveniles and smolts

### MGMT CODE (see below)

N, W,

### AFFECTED STOCK

Resident rainbow trout

Pacific lamprey

### BENEFIT OR DETRIMENT

Beneficial

Beneficial

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## BACKGROUND

### Stream name:

Trout Creek

### Subbasin:

Deschutes

### Stream miles affected:

70

### Land ownership:

approximately 25% public 75% private

### Habitat types:

Adult holding and spawning and juvenile rearing habitat.

### HISTORY:

In the period between 1986 and 1994, BPA funded habitat improvement work in the Trout Creek Watershed. During that time, 132 miles of riparian fence, 4,764 habitat structures, 11 spring developments, 20,923 feet of bank stabilization, 35 fish screens, and 750 cubic yards of spawning gravel was installed to improve summer steelhead habitat in an effort to increase natural production. In order to be able to install these improvements on private land, landowners signed 15-year leases that provide for maintenance of the improvements. This project provides for the operation and maintenance of these improvements. The last 15-year lease was signed in 1994.

## **BIOLOGICAL RESULTS ACHIEVED:**

This project has benefited wild summer steelhead as well as resident trout by providing increased habitat diversity, and increased shade and cover. The project has greatly increased instream habitat diversity, restored streamside vegetation and canopy, and eliminated streambank erosion on approximately 70 miles of stream. The project has also restored full passage by laddering and screening irrigation diversion structures and screening of irrigation pump intakes, with the exception of one landowner. Cattle and wheat ranchers as well as other land users have been educated on the importance of restoration of riparian areas.

The recent improvements on Trout Creek have allowed this stream to begin to recover from decades of habitat degradation due to overgrazing, logging, and road development. Without continued maintenance of these improvements, especially to riparian fencing, the riparian recovery that has occurred in the past nine years will be lost. Whereas, if these improvements are fully maintained for the 15-year term of the landowner leases this stream should be at almost full recovery.

## **PROJECT REPORTS AND PAPERS:**

Progress reports and billings due quarterly and monthly respectively.

## **ADAPTIVE MANAGEMENT IMPLICATIONS:**

The Trout Creek Habitat Restoration Project preserves management options within the Trout Creek basin for steelhead and resident species by improving critical habitat. This project will also allow for continued health of Trout Creek and its tributaries. Bank stabilization and vegetation work has eliminated the chronic problem of fill and removal violations associated with landowners temporary "fixes" to stream bank erosion following high water events.

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## **PURPOSE AND METHODS**

### **SPECIFIC MEASUREABLE OBJECTIVES:**

1. Provide unobstructed passage for migrations of adults and juveniles to achieve full seeding and utilization of suitable rearing habitat.
2. Maintain an average maximum summer water temperature of 75°F, or less, at the mouth of Trout Creek.
3. Provide healthy riparian vegetation on at least 80 percent of the perennial stream miles in the drainage.
4. Increase habitat diversity by increasing pool habitat to 40-50 percent of the total stream area in the drainage.
5. Within the constraints of land use practices, provide for less than 20 percent active erosion of stream banks.
6. Minimize the delivery of sediment from upland sources to the stream channel.

### **CRITICAL UNCERTAINTIES:**

The most critical uncertainty with this type of project is the fact that it relies heavily on the voluntary cooperation of the private landowners in the Trout Creek Basin. As restoration of the Trout Creek system has occurred, landowners have begun to take ownership in the project and have become more cooperative in the restoration effort. However, there is some uncertainty involved as land ownership changes take place, and the reality of the project is that if a landowner does not choose to cooperate in the project then no amount of maintenance effort will be enough to guarantee recovery.

### **BIOLOGICAL NEED:**

The Trout Creek Basin supports a remnant population of natural producing wild summer steelhead. Summer steelhead produced in the basin contribute to sport fisheries in the Deschutes and Columbia River. They also contribute to Indian treaty harvest in the Columbia River. Trout Creek and its tributaries also support a locally important recreational resident trout fishery.

Steelhead production capacity of Trout Creek is estimated at 1984 adults and 45,708 smolts (US v. Oregon, Trout Creek steelhead production report). Current spawner escapement, however, is estimated at <250 adults. This is only possible if habitat improvements implemented in the last eight years are maintained for the 15 years required for full restoration of Trout Creek.

The following factors have contributed to the reduction of the quantity or quality of rearing habitat include:

1. Up and downstream passage barriers. Adult steelhead are being blocked or detrimentally delayed on their upstream migration, resulting in the failure to seed suitable spawning and rearing habitat. Juvenile steelhead are likewise blocked from suitable rearing habitat by natural and man-made barriers. Additionally, juvenile steelhead are suffering direct mortalities through unscreened irrigation diversions.

2. Lethal summer water temperatures. High summer temperatures have greatly reduced rearing habitat capability. Most riparian areas on agricultural, and private timber lands are degraded due to livestock grazing and insufficient buffers maintained between cultivated fields and the stream channel. On National Forest lands the riparian vegetation is generally in good condition. The lack of riparian vegetation and low summer flows result in water temperatures up to 88° F at the mouth of Trout Creek
3. Low summer flows. Low summer flows associated with agricultural user demands and over logging on private timber lands decrease the quantity and quality of available suitable rearing habitat. Reduction of riparian habitat has decreased the moisture holding capability of stream adjacent soils and has diminished summer low flows
4. Lack of habitat diversity. The drainage is currently riffle dominated. The pool-riffle ratio, in existing suitable rearing habitat, is 1:10 due to channelization and lack of large woody debris input from the riparian zone. The lack of pools and cover reduce rearing habitat for steelhead, particularly yearling and older fish.
5. Lack of channel stability. The lack of channel stability has increased sediment loading and channel width while decreasing effective cover and the quantity of pool habitat. Channelization of Trout creek has reduced or eliminated the natural floodplains and channel sinuosity resulting in higher stream velocities which accelerate bank erosion and downcutting.
6. Sediment loading. Land use activities within the basin have increased sediment deposition to the stream channel. This increased sediment loading degrades spawning and rearing habitat.

The recent improvements on Trout Creek have allowed this stream to begin to recover from decades of habitat degradation due to overgrazing, logging, and road development. Without continued maintenance of these improvements, especially to riparian fencing, the riparian recovery that has occurred in the past nine years will be lost. Whereas, if these improvements are fully maintained for the 15-year term of the landowner leases this stream should be at almost full recovery.

#### **HYPOTHESIS TO BE TESTED:**

Null Hypothesis: By restoring and maintaining riparian vegetation, increasing habitat diversity and restoring full passage for adult and juvenile wild summer steelhead the projected annual return of adult steelhead to the Trout Creek Basin will not be effected.

Alternative Hypothesis: By restoring and maintaining riparian vegetation, increasing habitat diversity and restoring full passage for adult and juvenile wild summer steelhead the projected annual return of adult steelhead to the Trout Creek Basin will increase from approximately 250 to a high of approximately 2742.

#### **ALTERNATIVE APPROACHES:**

N/A

#### **JUSTIFICATION FOR PLANNING:**

N/A

#### **METHODS:**

Perform ongoing operation, maintenance, monitoring, and evaluation activities to ensure continued functioning of completed fish habitat improvements, and to document the effectiveness of improvement measures.

Inspect and maintain riparian corridor fences. All fences, including livestock watergaps, will be visually inspected at least once per month throughout the contract period. During periods of heavy livestock exposure or inclement weather, fences may be inspected more frequently. Fence condition and livestock usage and intensity will be documented. Damage from livestock, wildlife, weather, and other sources will be repaired as needed. Fence posts, wire, gates, hardware, and other components will be inspected for normal wear and weathering. Components will be replaced or repaired as needed.

Inspect and maintain bank stabilization and instream habitat structures. All instream fish habitat structures will be inspected annually in the spring, following high water or ice events. Damage to, or failure of structures will be documented. Repairs will be made only when structures have failed, are about to fail, or will become ineffective if not maintained. ODFW will implement such repairs through contracts with private equipment operators or with ODFW technicians. ODFW will coordinate with landowners to locate access for repairs, and to develop repair schedules that do not adversely affect landowner operations. ODFW will obtain required local, State, and Federal permits for construction activities and instream operations.

Inspect, operate, and maintain fish protection screens. The 13 rotary drum screens will be inspected monthly to ensure proper operation during the irrigation season (April through October). Damage or worn parts will be documented and repaired. All 22 rotary pump intake screens will be installed on irrigation pipes prior to the irrigation season. Each intake screens will be repaired and maintained as needed.

Monitor stream temperature. Document summer temperature changes attributable to riparian and stream channel recovery, and

investigate winter temperatures as well. Thermographs will be installed and operated continuously throughout the year at 16 locations

Monitor stream flows. Document changes attributable to riparian recovery and improved ground water storage. Flows will be measured during stable flow conditions in April and August

Photographic documentation. Photographs will be taken at designated photo points to document stream channel condition and riparian recovery. 132 photo points have been established at project sites throughout the subbasin. Photos will be taken in August under low flow conditions.

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## PLANNED ACTIVITIES

### SCHEDULE:

<b><u>Planning Phase</u></b>	<b><u>Start</u></b> 1983	<b><u>End</u></b> 1991	<b><u>Subcontractor</u></b>
<b><u>Task</u></b> Covered in METHODS section above.			
<b><u>Implementation Phase</u></b>	<b><u>Start</u></b> 1986	<b><u>End</u></b> 1994	<b><u>Subcontractor</u></b> Various private construction contractors
<b><u>Task</u></b> Construction of Riparian Fence and instream habitat improvements			
<b><u>O&amp;M Phase</u></b>	<b><u>Start</u></b> 1994	<b><u>End</u></b> 2009	<b><u>Subcontractor</u></b>
<b><u>Task</u></b> Operation and Maintenance of riparian fences and instream habitat improvements			

### PROJECT COMPLETION DATE:

2009

### CONSTRAINTS OR FACTORS THAT MAY CAUSE SCHEDULE OR BUDGET CHANGES:

(Landowner leases. This project occurs on private lands, and work is authorized through the use of 15 year riparian leases with private landowners. Landowner acceptance and cooperation are necessary on private lands to allow for implementation of improvement activities.) (Permits. Fill and removal permits or waivers from the Oregon Division of State Lands must be obtained before any instream fish habitat work is performed.)

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## OUTCOMES, MONITORING AND EVALUATION

### SUMMARY OF EXPECTED OUTCOMES

#### Expected performance of target population or quality change in land area affected:

A variety of benefits are projected to result from maintenance of the Trout Creek Habitat Restoration Project. Increases in average annual production of summer steelhead smolts are estimated to be approximately 46,000. This is an average annual increase of 280 percent above basin's current smolt production. Average annual adult increases in returns to the mouth of Trout Creek are estimated at 1984. This projection reflects estimated changes in production resulting from implementation of projects funded by BPA, and maintenance of these projects for 15 years.

In addition to increased fisheries production there will be: improvements to water quality (reduced sediment loads and summer water temperatures); improved bank stability (resulting from structural treatments and riparian restoration activities); significant increases in the amount and quality of riparian habitat benefiting many wildlife species; and increased landowner sensitivity and participation in riparian area and fish habitat management. Monitoring of this work has found:

- 1) dramatic increases in stream surface shading;
- 2) virtual elimination of severe bank erosion in treated areas;
- 3) re-establishment of dense riparian vegetation and general increases in use by riparian-dependent wildlife species; and
- 4) strong support for continued treatment by more than 90 % of landowners involved. Expected high levels of landowner cooperation and support, coupled with 15 year easements granted to ODFW for treatment areas, suggest that benefits of the basin improvement program should be substantial and long lasting.

#### Present utilization and conservation potential of target population or area:

unknown

**Assumed historic status of utilization and conservation potential:**

unknown

**Long term expected utilization and conservation potential for target population or habitat:**

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**Contribution toward long-term goal:**

Increased natural production of wild Deschutes River summer steelhead. Reduce stream temperatures and stream width. Increase rearing and spawning habitat, macro invertebrate populations, dissolved oxygen, bank cover and stream cover.

**Indirect biological or environmental changes:**

see above

**Physical products:**

Continued operation and maintenance of 132 miles of riparian fence protecting approximately 70 miles of stream, 4,764 instream habitat structures, 20,923 feet of juniper rip-rap, 35 fish protection screens and 11 off-stream water developments.

**Environmental attributes affected by the project:**

In addition to increased fisheries production there will be: improvements to water quality (reduced sediment loads and summer water temperatures); improved bank stability (resulting from structural treatments and riparian restoration activities); significant increases in the amount and quality of riparian habitat benefiting many wildlife species; and increased landowner sensitivity and participation in riparian area and fish habitat management. Monitoring of this work has found: 1) dramatic increases in stream surface shading; 2) virtual elimination of severe bank erosion in treated areas; 3) re-establishment of dense riparian vegetation and general increases in use by riparian-dependent wildlife species; and 4) strong support for continued treatment by more than 90 % of landowners involved. Expected high levels of landowner cooperation and support, coupled with 15 year easements granted to ODFW for treatment areas, suggest that benefits of the basin improvement program should be substantial and long lasting.

**Changes assumed or expected for affected environmental attributes:**

Near term. Elimination of livestock grazing in riparian area, reduced sedimentation from adjacent crop lands, increased shading, increased pool habitat, increased rearing habitat, increase in available spawning habitat. Long term. A healthy and productive stream and riparian area.

**Measure of attribute changes:**

unknown

**Assessment of effects on project outcomes of critical uncertainty:**

N/A

**Information products:**

N/A

**Coordination outcomes:**

The recent improvements on Trout Creek have allowed this stream to begin to recover from decades of habitat degradation due to overgrazing, logging, and road development. Without continued maintenance of these improvements, especially the riparian fencing, the riparian recovery that has occurred in the past nine years will be lost. Whereas, if these improvements are fully maintained for the 15-year term of the landowner lease, this stream should be at almost full recovery.

## MONITORING APPROACH

Perform ongoing operation, maintenance, monitoring, and evaluation activities to ensure continued functioning of completed fish habitat improvements, and to document the effectiveness of improvement measures.

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### Provisions to monitor population status or habitat quality:

see above

### Data analysis and evaluation:

Through normal channels, i.e., reports, memos and presentations.

## EVALUATION

The region could assess the project's overall performance by viewing project before and after photopoint photographs, by measuring riparian vegetation, by performing physical stream surveys and monitoring adult returns and downstream migrating smolts.

### Increasing public awareness of F&W activities:

This project increases the public awareness of the region's efforts to protect, mitigate and enhance fish and wildlife by: day to day coordination with private landowners and conservation agencies; and on the ground habitat improvements in the Trout Creek Basin.

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## RELATIONSHIPS

### RELATED BPA PROJECT

9404000

9304500 Buck Hollow Watershed Enhancement (odfw)

### RELATIONSHIP

shares equipment and personnel

shares equipment and personnel

### RELATED NON-BPA PROJECT

Oregon Trout

### RELATIONSHIP

Funds additional riparian fencing projects on Trout Creek

Oregon Water Trust

Leases and /or purchases water rights on Trout Creek to convert to instream water rights.

Fifteenmile Trout Creeks Screening Project/NMFS

Funds construction and maintenance of fish screens and passage projects on Trout Creek

#### **OPPORTUNITIES FOR COOPERATION:**

There is a large amount of cooperation on this project. The success of this project depends on cooperation with private landowners and other agencies such as the Jefferson County Soil and Water Conservation District, The U.S. Forest Service, The National Resource Conservation Service and the Bureau of Land Management; and non-profit organizations such as Oregon Trout and Oregon Water Trust.

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#### **COSTS AND FTE**

**1997 Planned:** \$250,000

#### **FUTURE FUNDING NEEDS:**

<u>FY</u>	<u>\$ NEED</u>	<u>% PLAN</u>	<u>% IMPLEMENT</u>	<u>% O AND M</u>
1998	\$250,000			100%
1999	\$250,000			100%
2000	\$250,000			100%
2001	\$250,000			100%
2002	\$250,000			100%

#### **PAST OBLIGATIONS (incl. 1997 if done):**

<u>FY</u>	<u>OBLIGATED</u>
1994	\$212,372
1995	\$186,885
1996	\$187,000
TOTAL:	\$586,257

Note: Data are past obligations, or amounts committed by year, not amounts billed. Does not include data for related projects.

<u>FY</u>	<u>OTHER FUNDING SOURCE</u>
1998	NMFS

<u>AMOUNT</u>	<u>IN-KIND VALUE</u>
\$100,000	

#### **OTHER NON-FINANCIAL SUPPORTERS:**

The USFS, BLM, Wasco County SWCD, CS, Oregon Trout, CTWS, Oregon Water Trust, and the private landowners in the Trout Creek basin.

#### **LONGER TERM COSTS:**

Expected annual costs will be \$250,000 per year through the year 2009 (the last 15 year riparian lease was signed in 1994).

**1997 OVERHEAD PERCENT:** 20.5%

#### **HOW DOES PERCENTAGE APPLY TO DIRECT COSTS:**

The above percentage applies only to personal services and supplies and services, it does not apply to contractual services.

**CONTRACTOR FTE:** 3.46

**SUBCONTRACTOR FTE:** N/A

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